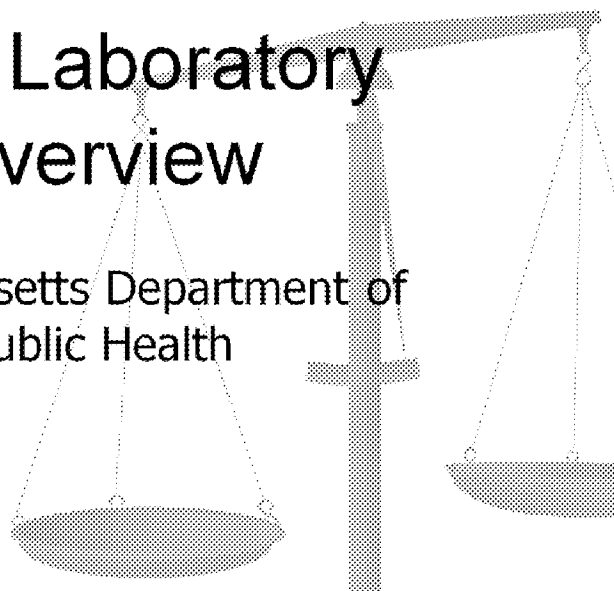


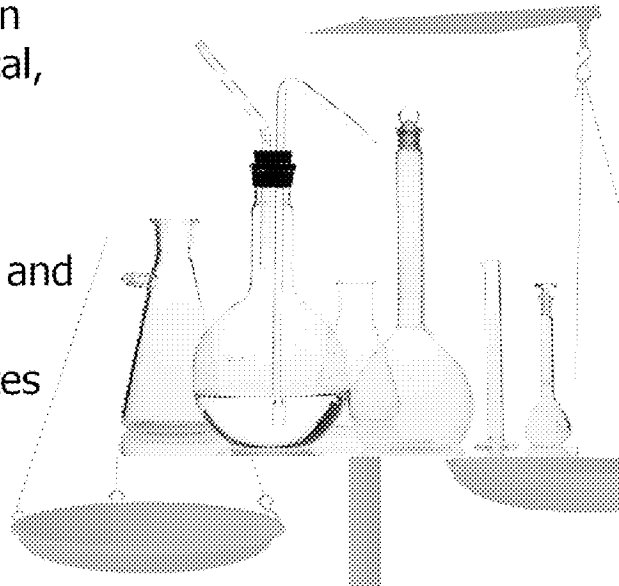
# Drug Laboratory Overview

Massachusetts Department of  
Public Health

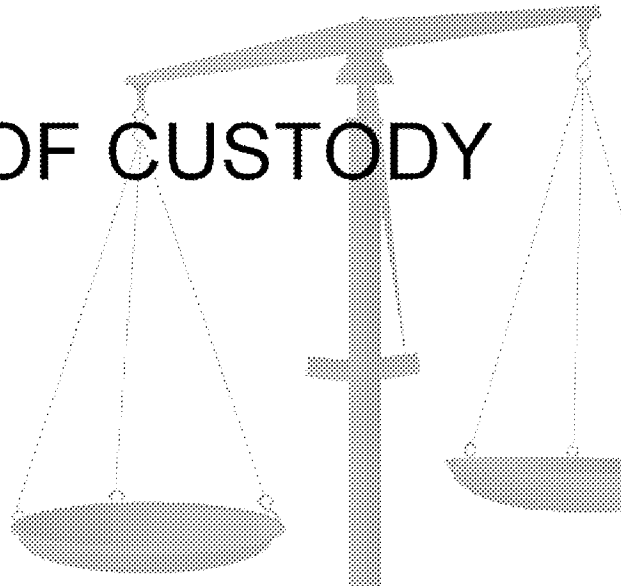


# Welcome to the Drug Lab!

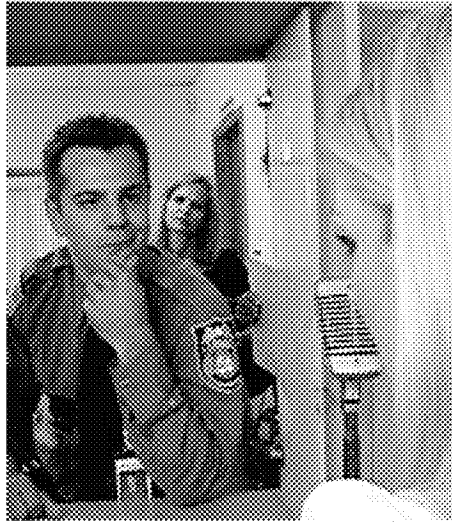
- Identifies unknown substances for local, state and federal agencies in Massachusetts.
- Provides accurate and timely analysis.
- Provides Certificates of Analysis.



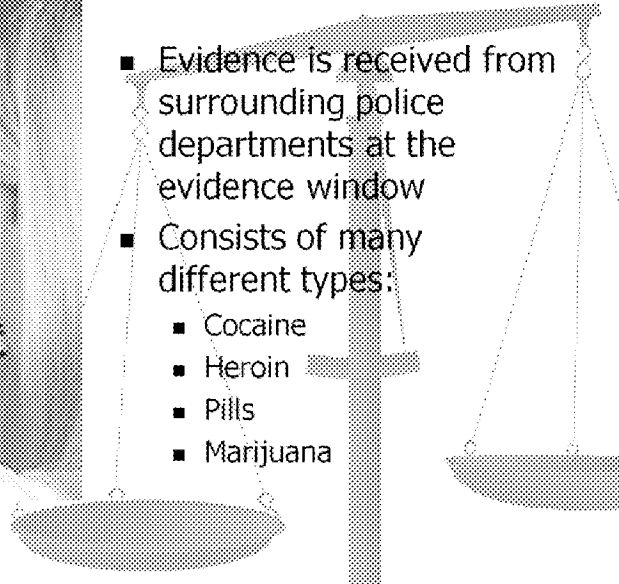
# CHAIN OF CUSTODY



# EVIDENCE SUBMISSION

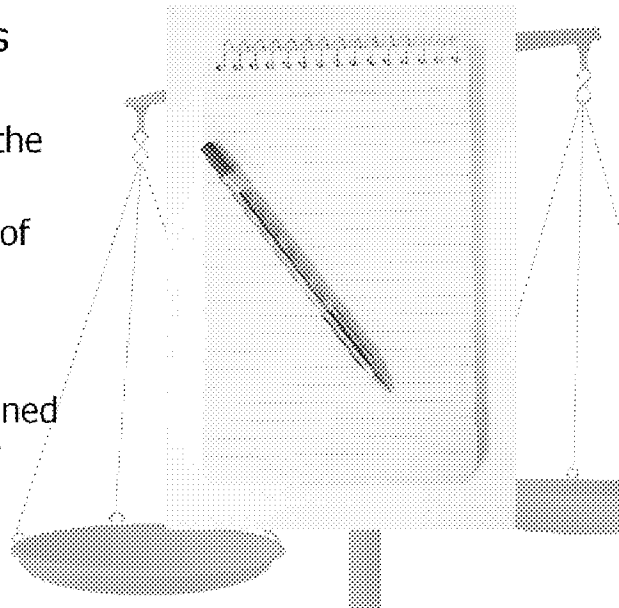


- Evidence is received from surrounding police departments at the evidence window
- Consists of many different types:
  - Cocaine
  - Heroin
  - Pills
  - Marijuana

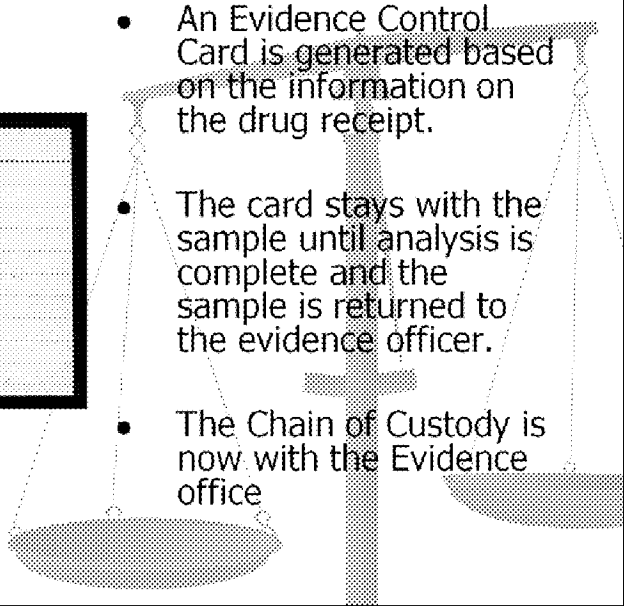


# EVIDENCE SUBMISSION

- A Drug Receipt is created.
  - A description of the item(s) is noted
  - An initial weight of the evidence is recorded
  - Each piece of evidence is assigned a lab number for reference



# EVIDENCE SUBMISSION



$$Y = \frac{M \times OP}{OP + OE}$$

$$X = M - Y$$

$$P = \frac{\text{Total H.P.} \times 33000 \times T.Y.C.}{M \times OP}$$

$$ET = \frac{\text{Area Engine cylinders} \times P}{2}$$

$$ET = \frac{OE}{OP} \times \frac{1}{2} \times P = \frac{OE \times P}{2 \times OP}$$

- An Evidence Control Card is generated based on the information on the drug receipt.
- The card stays with the sample until analysis is complete and the sample is returned to the evidence officer.
- The Chain of Custody is now with the Evidence office

# THE SAFE

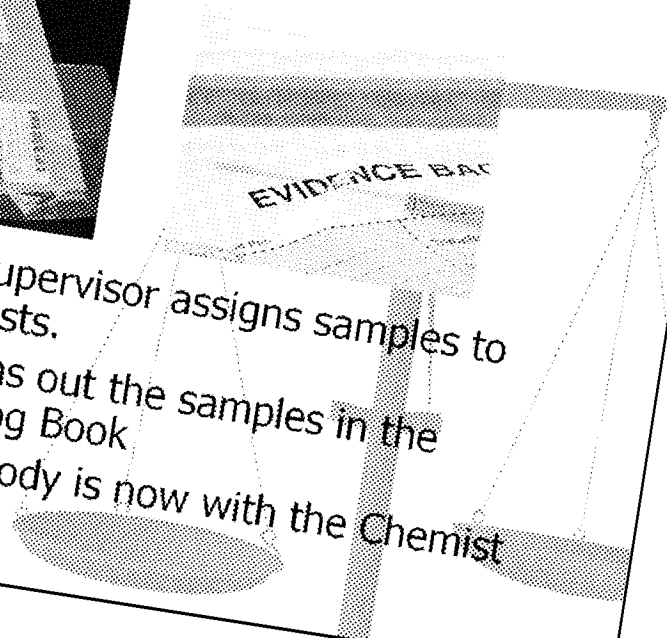
Evidence is transferred to the safe for storage



# EVIDENCE ASSIGNMENT

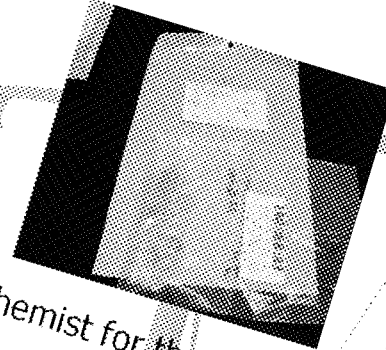


- The Evidence Supervisor assigns samples to individual chemists.
- The chemist signs out the samples in the corresponding Log Book
- The chain of custody is now with the Chemist





## Analysis



- Procedures are followed by the Chemist for the analysis of the samples
- There are different procedures based on the type of sample being analyzed (i.e. a suspected cocaine sample vs. a suspected marijuana sample)

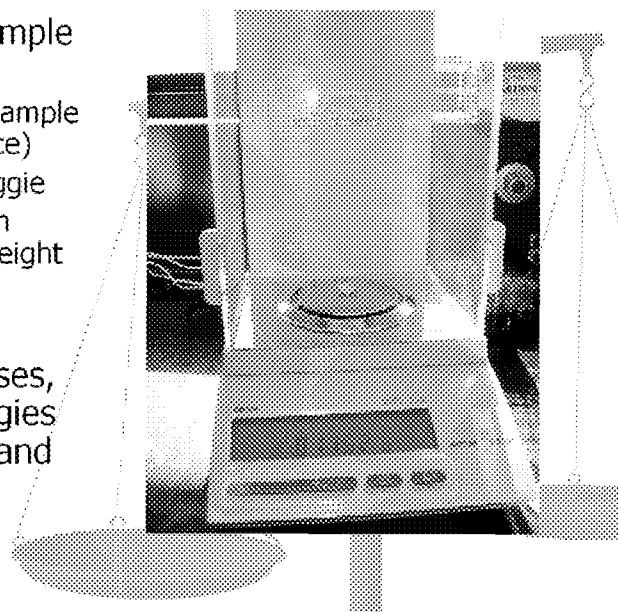
## Analysis – Cocaine



# Analysis – Cocaine

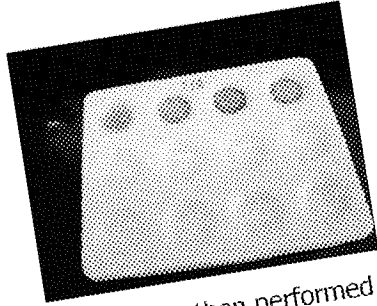
## Weight

- The weight of the sample is determined by:
  - Weighing the entire sample (baggie plus substance)
  - Weighing just the baggie
  - Subtracting the two in order to obtain the weight of the substance
- In the majority of cases, only 10% of the baggies need to be weighed and tested

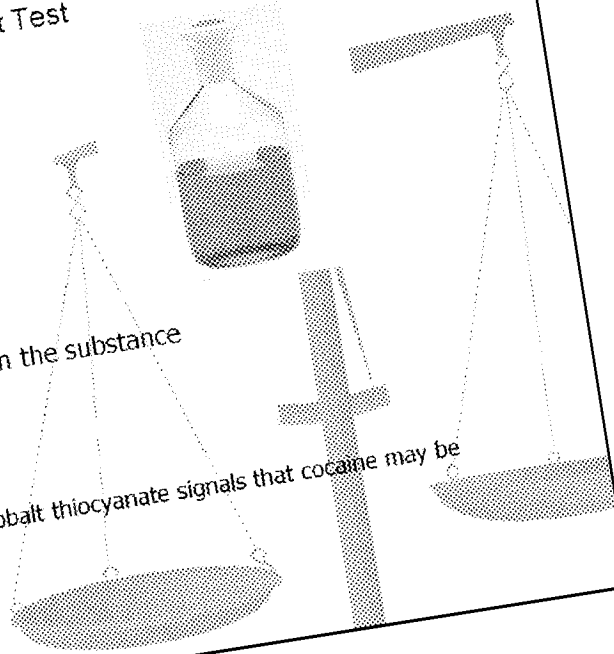


# Analysis – Cocaine

## Spot Test

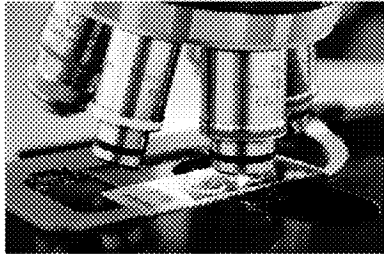


- A spot test is then performed on the substance
  - A total of four spot tests
    - Cobalt thiocyanate
    - Marquis
    - Froehdes
    - Meckes
  - A blue color change in the cobalt thiocyanate signals that cocaine may be present



# Analysis – Cocaine

## Microcrystalline Tests



- Performed if there is a positive cobalt thiocyanate test
- Two microcrystalline tests
  - Gold chloride
  - TLTA
- Cocaine will form specific crystals when added to these chemicals
- If crystals are present, the sample is submitted to GC/MS for confirmation of cocaine

# Analysis – Cocaine

Gas Chromatography/Mass Spectroscopy (GC-MS)



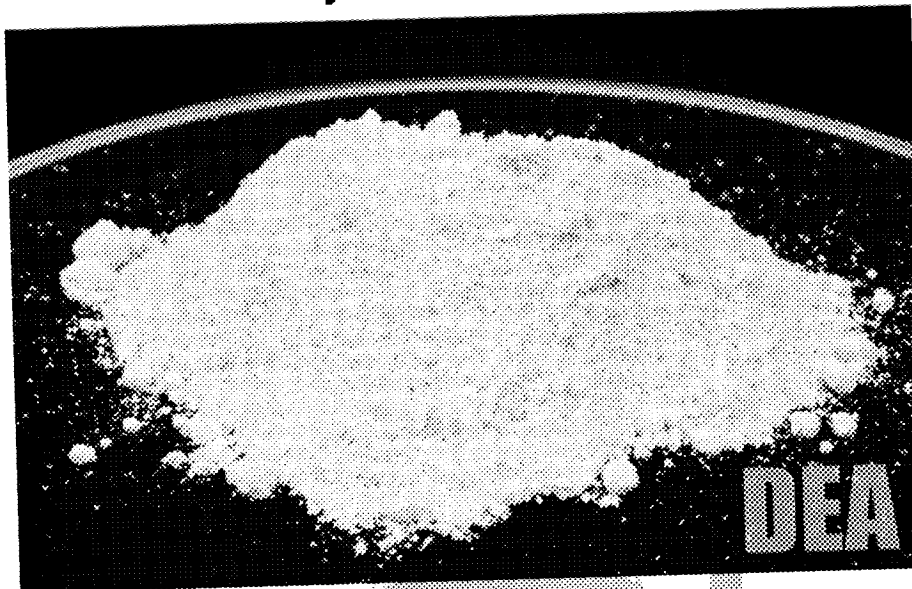
# Analysis – Cocaine

## Gas Chromatography/Mass Spectroscopy (GC/MS)

- A small amount of the substance is placed in a vial and dissolved with methanol (aliquot)
- A minute amount of sample is used when injected into the GC/MS
- The machine breaks down the substance into its core ions, and a print-out is generated
- The Chemist analyzes the print-out of the sample against a known standard to determine if cocaine is present



## Analysis – Heroin

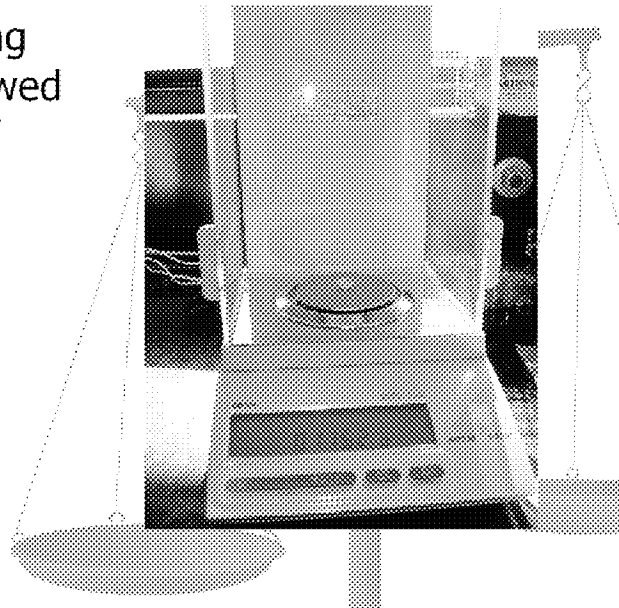




# Analysis – Heroin

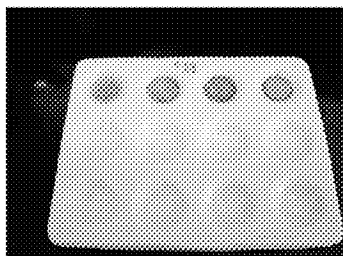
Weight

- The same weighing procedure is followed for the analysis of suspected heroin



# Analysis – Heroin

## Spot Test



- The same four spot tests are performed as well
  - A purple color change for the Marquis and Froehdes, and a green color change for the Meckes, signal that heroin may be present
- There are no microcrystalline tests performed if heroin is indicated in the spot tests

# Analysis – Heroin

Gas Chromatography/Mass Spectroscopy (GC-MS)

- The same procedure is followed for confirmatory testing using the GC/MS

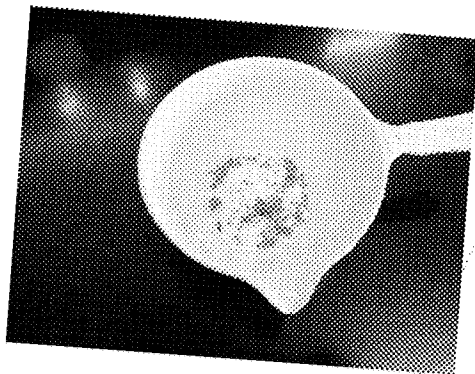


## Analysis – Marijuana

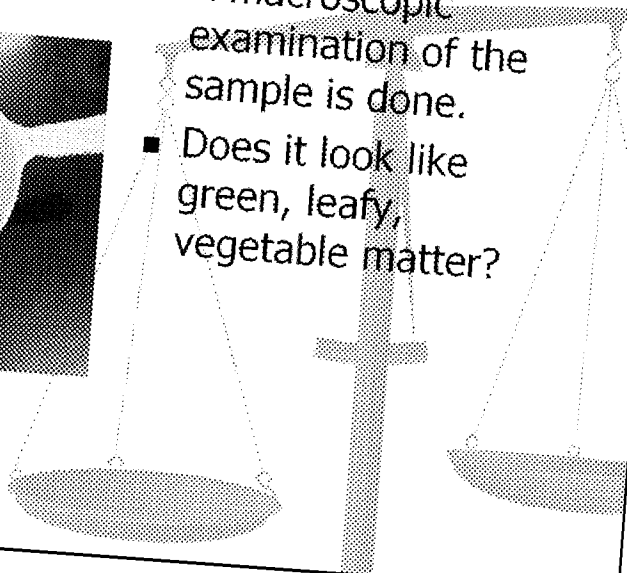


# Analysis – Marijuana

Macroscopic identification



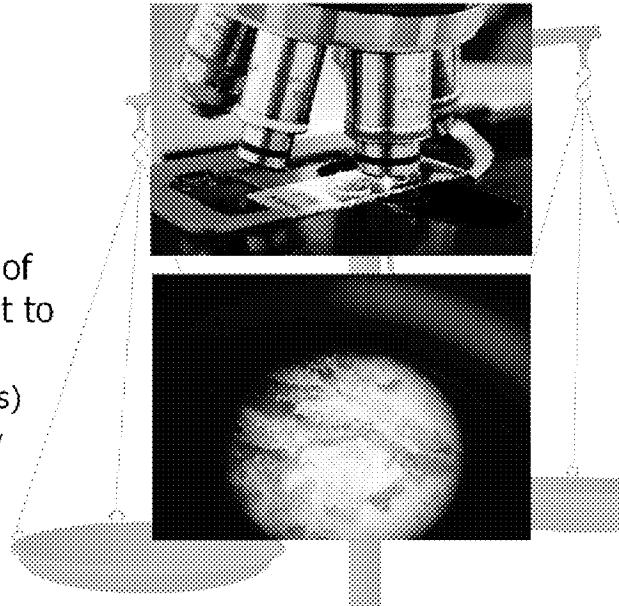
- A macroscopic examination of the sample is done.
- Does it look like green, leafy, vegetable matter?



# Analysis – Marijuana

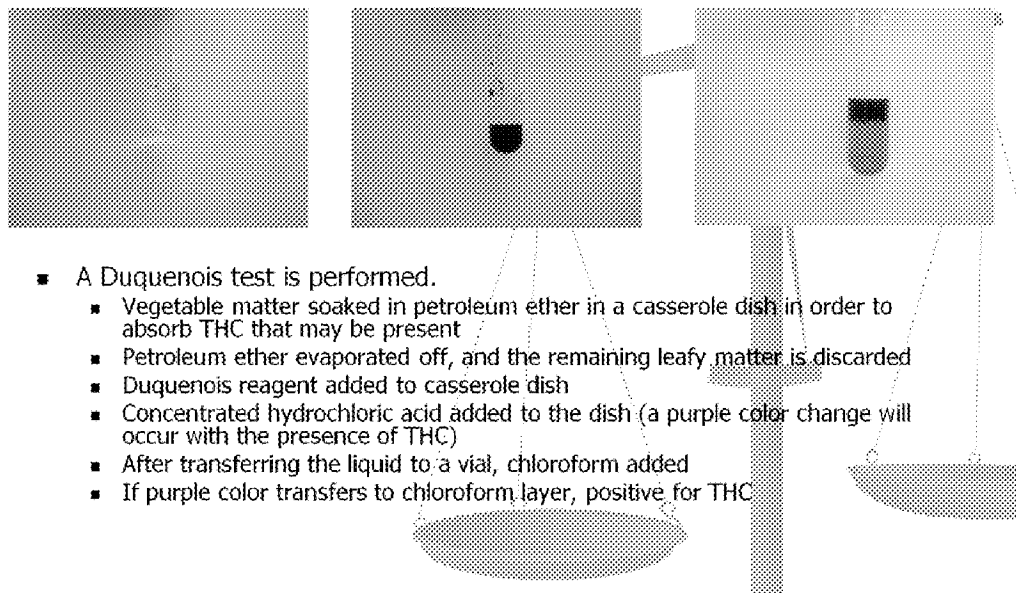
Microscopic identification

- A Microscopic identification of the sample is performed.
- Two particular types of hairs must be present to indicate marijuana
  - Cystolithic (bear claws)
  - Glandular (strawberry surface)

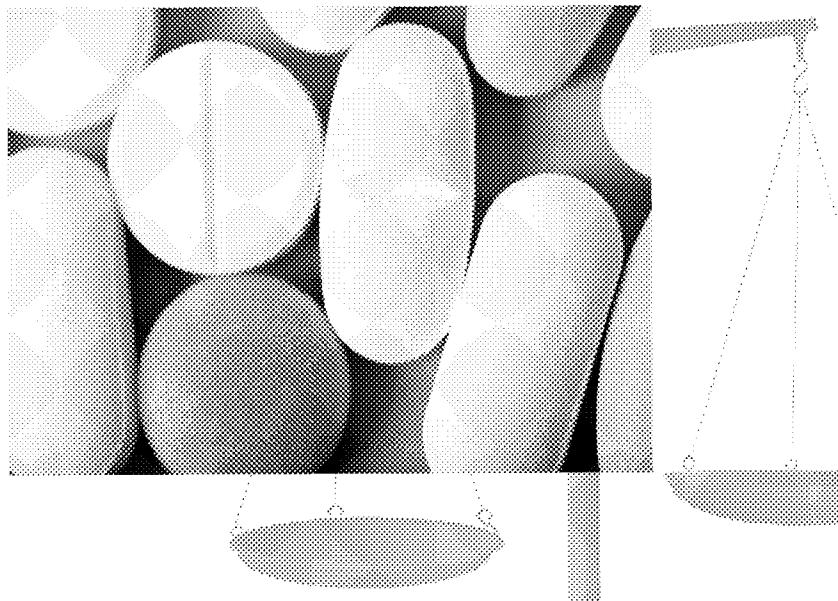


# Analysis – Marijuana

## Duquenois Identification



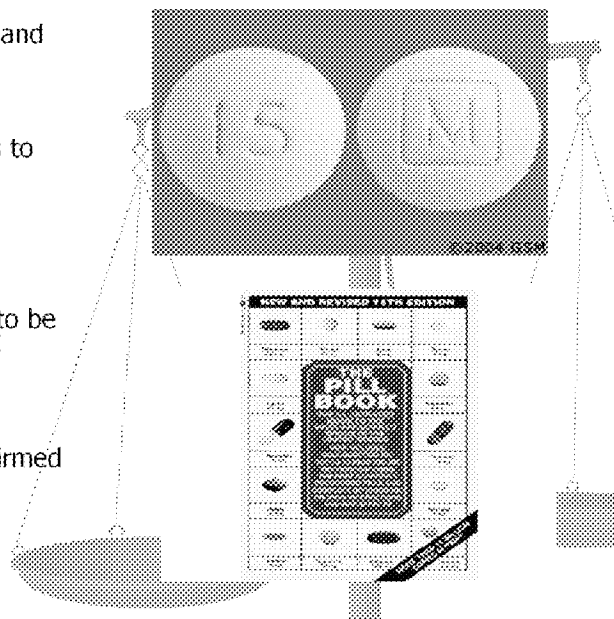
## Analysis – Rx





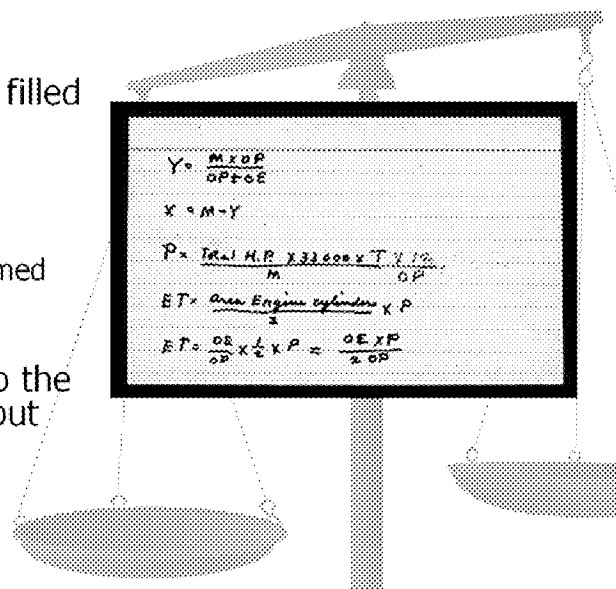
# Analysis – Rx

- Chemist examines capsules and tablets for identifying marks (shape, color, imprint)
- Chemist compares markings to those in a pharmaceutical identification manual.
  - Micromedex
  - Drug Bible
- Those samples determined to be containing a class A, B, or C substance will undergo a confirmatory test by GC/MS
- Class E substances are confirmed by appearance and labeling



# Evidence Card

- The evidence card is filled out by the chemist.
  - Results of testing
  - Weight
  - Date analyzed
  - Chemists who performed the analysis
- Cards are returned to the evidence office and put on file.

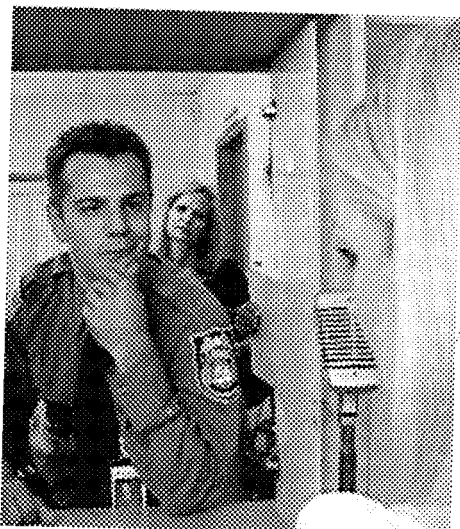


# Drug Certificate

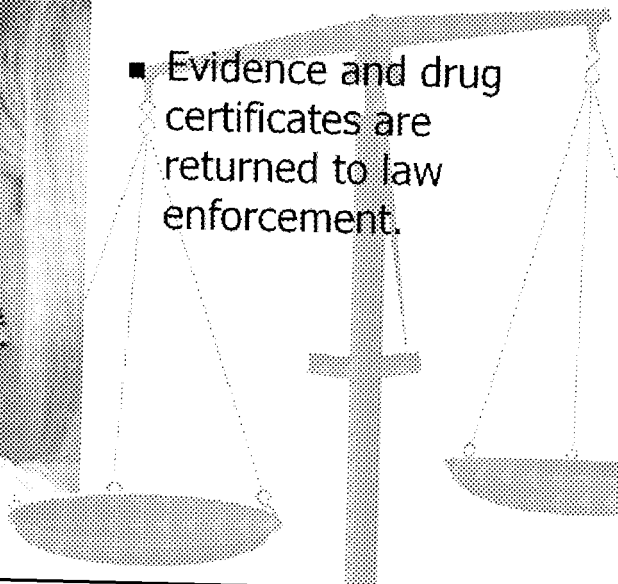
[illegible]

- A Drug Certificate is generated, signed by the chemists and attached to the sample.
- The first signature is the primary, or custodial chemist, who performed the preliminary analysis. The second signature is the chemist who performed confirmatory testing.

# EVIDENCE RETURN



- Evidence and drug certificates are returned to law enforcement.



# Courts

## Discovery Packets

- ADAs may request a discovery packet from the lab.
- Discovery packets consist of:
  - Drug Receipt
  - Evidence Control Card
  - Chemist Drug Analysis Sheets
  - GC/MS Analytical Data

